

## CLAIMS

What is claimed is:

1. A communication method for use in a dynamic network comprising the steps of:

allocating network resources to a data stream based upon precedence levels of other data streams desiring the same resources or already utilizing the same resources.

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2. The method recited in Claim 1 wherein control signaling is used to find routes by:

finding routes from a source to a destination that can be supported at a given precedence level;

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notifying upstream nodes if the resources at that node are committed to higher precedence streams; and

notifying upstream nodes that an in-place stream may be interrupted by a new higher precedence stream.

3. The method recited in Claim 2 wherein nodes track the control signaling in a routing database and use this retained information to either facilitate a route request or to ensure that low precedence control is not forwarded into portions of the network known to require higher precedence.

4. The method recited in Claim 2 wherein uninterrupted transport is assured by the method comprising the steps of:

establishing a primary route for data flow of a given precedence from a first node to a second node of the network using resources available at that precedence or lower;

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establishing a secondary route for data flow from the first node to the second node using resources available at that precedence or lower;

upon the occurrence of a failure of the primary route, switching the data flow from the primary route to the secondary route;

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establishing a new secondary route for data flow from the first node to the second node using signaling directed only to resources known to not be restricted to higher precedence levels;

repeating the above steps again and again as intra-node links of the network are established and broken.

5. The method recited in Claim 4 wherein:  
 if a higher precedence flow is switched to a secondary route used by a lower precedence flow, the lower precedence flow is switched to its secondary route.

6. The method recited in Claim 4 wherein secondary routes at each precedence level are monitored for quality by:

sending low rate probe messages through the secondary routes;

if a fault is detected in a secondary route, establishing a new secondary route.

5 even though the new secondary route might never be used; and

if a secondary route is preempted by a flow with higher precedence, a new secondary route is established for the lower precedence flow.

7. The method recited in Claim 4 wherein control messages are exchanged at a low rate between software agents at nodes of the network and are forwarded along active and secondary routes.

8. The method recited in Claim 7 wherein the control messages are handled at the same precedence level as their flows.

9. The method recited in Claim 7 wherein the agents respond to requests from other agents for node status, arbitrate resource allocation according to precedence, assess route failure probability, initiate restoral switchover, and maintain a local routing database.

10. The method recited in Claim 1 wherein network resource allocation is based upon link bandwidth.

11. The method recited in Claim 1 wherein network resource allocation is based upon priority position in a queue.

12. The method recited in Claim 1 wherein network resource allocation is based upon priority position in a central processing unit.

13. The method recited in Claim 1 wherein network resource allocation is based upon memory capacity for processing